UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/934,000 | 08/21/2001 | Sascha Nick | 212423 | 7712 |

23626 7590 02/22/2007

LEYDIG VOIT & MAYER, LTD.
(ROCKFORD OFFICE)
TWO PRUDENTIAL PLAZA, SUITE 4900
180 NORTH STESTON AVENUE
CHICAGO, IL 60601-6731

| EXAMINER | |
|---|---|
| BURGESS, BARBARA N | |
| **ART UNIT** | **PAPER NUMBER** |
| 2157 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 02/22/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/934,000 | NICK, SASCHA | |
| | Examiner | Art Unit | |
| | Barbara N. Burgess | 2157 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11-20-07*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-6 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *2-19-07*.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

This Office Action is in response to Amendment filed November 20, 2006. Claims 1-6, 20 are presented for further examination.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 6, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Almstead et al. (hereinafter "Almstead", US Patent 6,4991148 B1) in view of Haynes et al. (hereinafter "Haynes", US Patent 4,965,513) in further view of Conway et al. (hereinafter "Conway", US Patent No. 5,608,657).

As per claim 1, Almstead discloses a method for remotely monitoring and diagnosing operations of a machine, the method comprising:

- Detecting signals of one or more of the machine's operating and condition parameters (column 3, lines 6-8, column 4, lines 22-30, column 5, lines 45-49);
- Transmitting information describing each anomaly to a first computing device located remotely from the machine (column 3, lines 27-32, column 5, lines 34-35, column 7, lines 1-5, 11-15);

- Diagnosing the information describing the anomaly, where the diagnosing comprises:
- An initial analysis of the information by diagnostic tools maintained at the first computing device (column 5, lines 11-35, column 8, lines 50-65);
- Reporting the diagnosis of the anomaly to a location capable of attending to repair of the machine (column 8, lines 58-65, column 14, lines 43-45).

Almstead does not explicitly disclose:

- Comparing the detected signals to a signal model maintained locally with respect to the machine's location and identifying any anomalies in the detected signals compared to the signal model.

However, in an analogous art, Haynes discloses diagnosing the operating characteristics of electric motor-driven mechanical devices in which electrical signals are analyzed to provide a current noise signature for which various operating characteristics of the device may be observed. The signatures are taken at different periods during the life of the device and may be compared to determine aging and wear or abnormal operating characteristics (column 3, line 20-40, column 6, lines 20-30).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Hyanes's comparing the detected signals to a signal model in Almstead's method in order to determine aging and wear or abnormal characteristics of the device.

Almstead, in view of Haynes, does not explicitly disclose:

- A subsequent analysis of the information by diagnostic tools maintained at a peer computing device located remotely from the first computing device if the initial analysis fails to provide a diagnosis;
- A final analysis by a team of humans aided by a collaborative environment if the initial and subsequent analyses fail to provide a diagnosis.

However, in an analogous art, Conway discloses a line technician for carrying out diagnostics. Should the line technician be unable to satisfactorily resolve the issue, the problem is communicated to a consulting expert or maybe even a team of experts. The remote parties communicate using data transfer mode to voice mode (column 2, lines 49-64, column 6, lines 50-65).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to incorporate or implement Conway's subsequent analysis and final analysis in Almstead's method in order that the proper diagnosis of the problem is made.

As per claim 2, Almstead discloses the method for remotely monitoring and diagnosing operations of a machine as set forth in claim 1 wherein the step of detecting signals of machine operating and condition parameters includes continuously monitoring at least one of the operating parameters and the condition parameters (column 4, lines 22-30).

As per claim 3, Almstead discloses the method for remotely monitoring and diagnosing operations of a machine as set forth in claim 1.

Almstead does not explicitly disclose wherein the signal model is a statistical model based on an initial collection of the detected signals.

However, in an analogous art, Haynes discloses the noise signature frequency being displayed on an oscilloscope and/or recorded on a recording device. At different mechanical gear meshings and shaft rotations, peaks/frequencies can be observed and compared (column 5, lines 22-30, column 6, lines 30-50).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Haynes's statistical model in Almstead's method in order to show the operation of the device at different frequencies.

As per claim 6, Almstead discloses the method for remotely monitoring and diagnosing operations of a machine as set forth in claim 1.

Almstead, in view of Haynes, does not explicitly disclose:

- Including the step of adding the diagnosis to the diagnostic tools maintained at the remote location if the diagnosis is provided by one of the diagnostic tools maintained elsewhere and the team of humans.

However, in an analogous art, Conway discloses a line technician for carrying out diagnostics. Should the line technician be unable to satisfactorily resolve the issue, the problem is communicated to a consulting expert or maybe even a team of experts. The remote parties communicate using data transfer mode to voice mode (column 2, lines 49-64, column 6, lines 50-65).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to incorporate or implement Conway's subsequent analysis and final analysis in Almstead's method in order that the proper diagnosis of the problem is made.

As per claim 20, Almstead discloses a method for remotely monitoring and diagnosing operations of a machine, the method comprising:

- Detecting signals of one or more of the machine's operating and condition parameters (column 3, lines 6-8, column 4, lines 22-30, column 5, lines 45-49);
- If the detected signals do not conform to the signal model, then informing a first computing device located remotely from the machine of an anomaly (column 3, lines 27-32, column 5, lines 34-35, column 7, lines 1-5, 11-15);
- Diagnosing the information describing the anomaly, where the diagnosing comprises:
- An initial analysis of the information by diagnostic tools maintained at the first computing device (column 5, lines 11-35, column 8, lines 50-65);
- Reporting the diagnosis of the anomaly to a location capable of attending to repair of the machine (column 8, lines 58-65, column 14, lines 43-45).

Almstead does not explicitly disclose:

- Comparing the detected signals to a signal model maintained locally with respect to the machine's location and identifying whether or not the detected signals conform to the signal model.

However, in an analogous art, Haynes discloses diagnosing the operating characteristics of electric motor-driven mechanical devices in which electrical signals are analyzed to provide a current noise signature for which various operating characteristics of the device may be observed. The signatures are taken at different periods during the life of the device and may be compared to determine aging and wear or abnormal operating characteristics (column 3, line 20-40, column 6, lines 20-30).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Haynes's comparing the detected signals to a signal model in Almstead's method in order to determine aging and wear or abnormal characteristics of the device.

Almstead, in view of Haynes, does not explicitly disclose:

- A subsequent analysis of the information by diagnostic tools maintained at a peer computing device located remotely from the first computing device if the initial analysis fails to provide a diagnosis;
- A final analysis by a team of humans aided by a collaborative environment if the initial and subsequent analyses fail to provide a diagnosis.

However, in an analogous art, Conway discloses a line technician for carrying out diagnostics. Should the line technician be unable to satisfactorily resolve the issue, the problem is communicated to a consulting expert or maybe even a team of experts. The remote parties communicate using data transfer mode to voice mode (column 2, lines 49-64, column 6, lines 50-65).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to incorporate or implement Conway's subsequent analysis and final analysis in Almstead's method in order that the proper diagnosis of the problem is made.

3. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Almstead et al. (hereinafter "Almstead", US Patent 6,4991148 B1) in view of Haynes et al. (hereinafter "Haynes", US Patent 4,965,513) in further view of Conway et al. (hereinafter "Conway", US Patent No. 5,608,657) and in further view of Lowenstein et al. (hereinafter "Low", US Patent 5,319,513).

As per claim 4, Almstead further discloses the method for remotely monitoring and diagnosing operations of a machine as set forth in claim 1.
Almstead, in view of Haynes and Conway, does not explicitly disclose wherein the detected signals are derived from a plurality of sensors, the method including the steps of:

- Identifying a failed sensor;
- Regenerating the signal model based on remaining sensors;
- Monitoring the machine based on the remaining sensors and the signal model until the failed sensor is repaired or replaced.

However, in an analogous art, Low discloses detecting the inoperation of capacitor cells and fuses. Should either of these be inoperable, a disconnect mechanism is activated

and the monitor rechecks the conditions and compares to normal operating conditions. (column 3, lines 35-67, column 5, lines 34-37, column 6, lines 1-5).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Low's identifying a failed sensor, regenerating the signal model, and monitoring the machine based on remaining sensors in Almstead's method in order to maintain operation status.

As per claim 5, Almstead discloses the method for remotely monitoring and diagnosing operations of a machine as set forth in claim 1.

Almstead, in view of Haynes and Conway, does not explicitly disclose wherein the detected signals are derived from a plurality of sensors, the method including the step of generating a sensor replacement signal if the identified anomaly is based on a detected signal from a single sensor such that the replacement signal is substituted into the detected signals as a placement for the detected signal from the single sensor and the step of comparing includes the step of comparing the detected signals containing the replacement signal to the signal model.

However, in an analogous art, Low discloses detecting the inoperation of capacitor cells and fuses. Should either of these be inoperable, a disconnect mechanism is activated and the monitor rechecks the conditions and compares to normal operating conditions. (column 3, lines 35-67, column 5, lines 34-37, column 6, lines 1-5).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Low's generating a replacement signal in Almstead's method in order to maintain operation status.

***Response to Arguments***

**The Office notes the following arguments:**

(a) Nowhere does the cited art discuss calling in peer remote computing devices to help in the diagnosis.

(b) Conway does not teach adding to the diagnostic tools, that is, enhancing the set of diagnostic tools in response to the resolution of an anomaly.

**In response to:**

(a) Almstead discloses an *on-site monitor* (*first computing device* located remotely from the machine) located in a power plant and interfaced with monitored equipment (i.e. turbine or generator). The on-site monitor is remote from the monitored equipment. Almstead further discloses the on-site monitor can be coupled to the monitored equipment (local to the equipment). Therefore, the on-site monitor can be considered both remote and local as to the location of monitored equipment.

Anomaly information is sent to the on-site monitor for diagnosing. The on-site monitor performs diagnostic functions such as analyzing the received data.

Further analysis is performed at a *remote diagnostic center* (subsequent analysis...by diagnostic tools maintained at a *peer computing device* located remotely from first computing device). The remote diagnostic center forms diagnostics and provides

reports. These results can be provided to an operator (column 3, lines 5-10, 30-32, column 4, lines 22-30, 36-38, column 5, lines 28-34, column 8, lines 50-65).

Therefore, Almstead indeed discloses "calling in peer remote computing devices to help in the diagnosis".

(b) Almstead discloses the diagnostic results from the diagnostic center are reported to an operator at the site of the on-site monitor (remote first computing device). The on-site monitor also has access to the diagnostic reports (column 8, lines 58-65, column 14, lines 42-45).

Therefore, Almstead discloses, "adding diagnostics to the diagnostic tools maintained at the remote location..."

***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara N. Burgess whose telephone number is (571) 272-3996. The examiner can normally be reached on M-F (8:00am-4:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Ettinene can be reached on (571) 272-4001. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Barbara N Burgess
Examiner
Art Unit 2157

February 19, 2007

ARIO ETIENNE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100